RESIDENTIAL

GAS WATER HEATERS
OWNER'S MANUAL

Thank you for buying this energy efficient water heater from A.O. Smith Water Products Company. We appreciate your confidence in our products.

You should thoroughly read this manual before installation and/or operation of this water heater. Please pay particular attention to the important safety and operating instructions as well as the WARNINGS and CAUTIONS.

Power Vented Gas Models GPSH/GPCR
with Hot Surface Ignition

DESIGN CERTIFIED

WARNING: If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury or death.

— Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

— WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

— Installation and service must be performed by a qualified installer, service agency or the gas supplier.

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⚠ CAUTION

TEXT PRINTED OR OUTLINED IN RED CONTAINS INFORMATION RELATIVE TO YOUR SAFETY. PLEASE READ THOROUGHLY BEFORE INSTALLING AND USING THIS APPLIANCE.

A.O. SMITH
WATER PRODUCTS COMPANY
A DIVISION OF A.O. SMITH CORPORATION
MCBEE, SOUTH CAROLINA
www.hotwater.com

KEEP THIS MANUAL IN THE POCKET ON THE HEATER FOR FUTURE REFERENCE WHENEVER MAINTENANCE ADJUSTMENT OR SERVICE IS REQUIRED.

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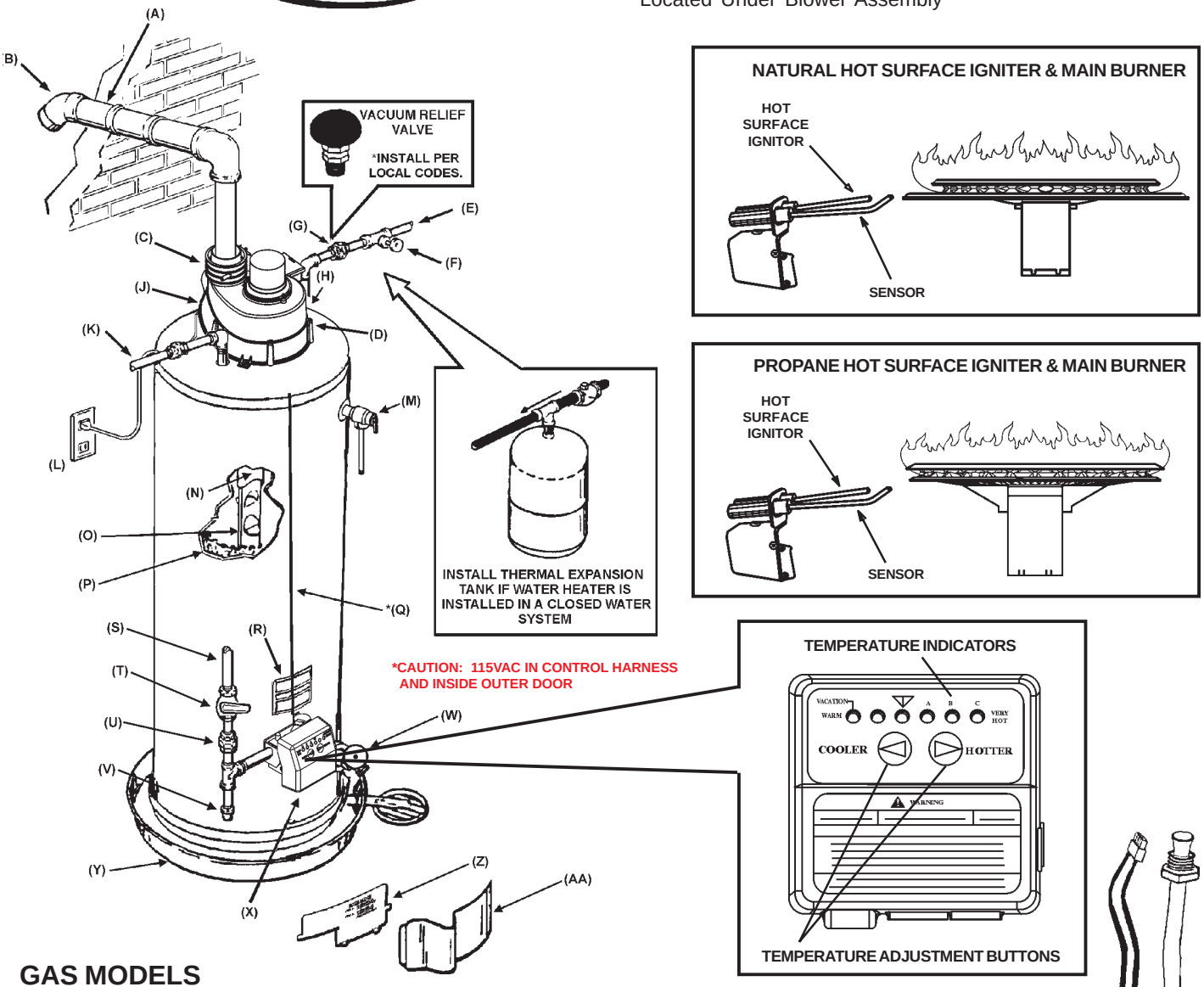
GET TO KNOW YOUR WATER HEATER

REPLACEMENT PARTS AND DELIMING PRODUCTS

Replacement parts and recommended delimer may be ordered through authorized servicers or distributors. Refer to the Yellow Pages for where to call. When ordering parts, provide complete model and serial numbers (see rating plate), quantity and name of part desired (as listed in Figure 1). Standard hardware items may be purchased locally.

(A) Vent Pipe - Exhaust
(B) Vent Terminal
(C) Vent Adapter-Rubber Boot
(D) Blower Assembly
(E) Cold Water Inlet
(F) Inlet Water Shut-off Valve
(G) Union
(H) Inlet Dip Tube
(J) Anode**
(K) Hot Water Outlet
(L) Oulet Receptacle (115 VAC)
(M) Temperature-Pressure Relief Valve
(N) Flue
(O) Flue Baffle Assembly**
(P) Insulation
(Q) Control Harness
(R) Rating Plate
(S) Gas Supply
(T) Manual Gas Shut-off Valve
(U) Ground Joint Union
(V) Dirt Leg (Sediment Trap)
(W) Drain Valve
(X) Gas Valve - Thermostat
(Y) Drain Pan
(Z) Inner Door
(AA) Outer Door
(BB) HSI Burner Assembly

**Located Under Blower Assembly


VACUUM RELIEF VALVE
*INSTALL PER LOCAL CODES.
INSTALL THERMAL EXPANSION TANK IF WATER HEATER IS INSTALLED IN A CLOSED WATER SYSTEM
*CAUTION: 115VAC IN CONTROL HARNESS AND INSIDE OUTER DOOR
NATURAL HOT SURFACE IGNITER & MAIN BURNER
HOT SURFACE IGNITOR
SENSOR
PROPANE HOT SURFACE IGNITER & MAIN BURNER
HOT SURFACE IGNITOR
SENSOR
TEMPERATURE INDICATORS
COOLER
HOTTER
TEMPERATURE ADJUSTMENT BUTTONS
(BB)

GAS MODELS
WITH HOT SURFACE IGNITION
& - 2" OR 3" PVC VENT CAPABILITY

A.O. SMITH WATER PRODUCTS COMPANY

FIGURE 1

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GENERAL SAFETY INFORMATION

EXTERNAL DAMAGE

Do not operate the water heater until it has been fully checked out by a qualified technician, if the water heater:

- Has been exposed to fire or damage.
- Displays evidence of sooting.
- Produces steam or unusually hot water.

If the water heater has been flooded it must be replaced.

CHEMICAL VAPOR CORROSION

WARNING

CORROSION OF THE FLUEWAYS AND VENT SYSTEM MAY OCCUR IF AIR FOR COMBUSTION CONTAINS CERTAIN CHEMICAL VAPORS. SUCH CORROSION MAY RESULT IN FAILURE AND RISK OF ASPHYXIATION.

Spray can propellants, cleaning solvents, refrigerator and air conditioning refrigerants, swimming pool chemicals, calcium and sodium chloride (water softener salt), waxes, and process chemicals are typical compounds which are potentially corrosive.

Do not store products of this sort near the heater. Also, air which is brought in contact with the heater should not contain any of these chemicals. If necessary, uncontaminated air should be obtained from remote or outside sources. The limited warranty is voided when failure of water heater is due to a corrosive atmosphere. (Reference is made to the limited warranty for complete terms and conditions).

IMPROPER COMBUSTION

WARNING

ATTIC AND/OR EXHAUST FANS OPERATING ON THE PREMISES WITH A WATER HEATER CAN RESULT IN CARBON MONOXIDE POISONING AND DEATH.

OPERATION OF THESE FANS CAN PRODUCE A NEGATIVE DRAFT IN THE AREA OF THE WATER HEATER PREVENTING THE PRODUCTS OF COMBUSTION FROM EXHAUSTING THROUGH THE VENT PIPE.

The venting of the water heater should be inspected by a qualified service technician at the time of installation and periodically thereafter to ensure a down-draft condition does not exist.

DO NOT OBSTRUCT THE FLOW OF COMBUSTION AND VENTILATING AIR. ADEQUATE AIR FOR COMBUSTION AND VENTILATION MUST BE PROVIDED FOR SAFE OPERATION.

LIQUID PETROLEUM MODELS

WARNING

Water heaters for propane or liquefied petroleum gas (LPG) are different from natural gas models. A natural gas heater will not function safely on LP gas and no attempt should be made to convert a heater from natural gas to LP gas.

LP gas must be used with great caution. It is highly explosive and heavier than air. It collects first in the low areas making its odor difficult to detect at nose level. If LP gas is present or even suspected, do not attempt to find the cause yourself. Go to a neighbor's house, leaving your doors open to ventilate the house, then call your gas supplier or service agent. Keep area clear until a service call has been made.

At times you may not be able to smell an LP gas leak. One cause is odor fade, which is a loss of the chemical odorant that gives LP gas its distinctive smell. Another cause can be your physical condition, such as having a cold or a diminishing sense of smell with age. For these reasons, the use of a propane gas detector is recommended.

IF YOU EXPERIENCE AN OUT-OF-GAS SITUATION, DO NOT TRY TO RELIGHT APPLIANCE YOURSELF. Ask your LP delivery person to relight pilots for you. Only trained LP professionals should conduct the required safety checks in accordance with industry standards.

EXTENDED NON-USE PERIODS

WARNING

HYDROGEN GAS CAN BE PRODUCED IN A HOT WATER SYSTEM SERVED BY THIS HEATER THAT HAS NOT BEEN USED FOR A LONG PERIOD OF TIME (GENERALLY TWO WEEKS OR MORE). HYDROGEN GAS IS EXTREMELY FLAMMABLE. To reduce the risk of injury under these conditions, it is recommended that the hot water faucet be opened for several minutes at the kitchen sink before using any electrical appliance connected to the hot water system. If hydrogen is present, there will probably be an unusual sound such as air escaping through the pipe as the water begins to flow. THERE SHOULD BE NO SMOKING OR OPEN FLAME NEAR THE FAUCET AT THE TIME IT IS OPEN.

INSULATION BLANKETS

Insulation blankets available to the general public for external use on gas water heaters are not approved for use on your water heater. The purpose of an insulation blanket is to reduce the standby heat loss encountered with storage tank heaters. Your water heater meets and exceeds the National Appliance Energy Conservation Act standards with respect to insulation and standby loss requirements, making an insulation blanket unnecessary.

WARNING

Should you choose to apply an insulation blanket to this heater, you should follow these instructions (See Figure 1 for identification of components mentioned below). Failure to follow these instructions can restrict the air flow required for proper combustion, potentially resulting in fire, asphyxiation, serious personal injury or death.

- Do not cover the outer door, thermostat or temperature & pressure relief valve.
- Do not allow insulation to come within 2 inches of dilution air inlet on the blower to prevent blockage of the dilution air.
- Do not allow insulation to come within 2" of the floor to prevent blockage of combustion air flow to the burner.
- Do not cover the instruction manual. Keep it on the side of the water heater or nearby for future reference.
- Do obtain new warning and instruction labels for placement on the blanket directly over the existing labels.
- Do inspect the insulation blanket frequently to make certain it does not sag, thereby obstructing combustion air flow.

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INSTALLATION

REQUIRED ABILITY

INSTALLATION OR SERVICE OF THIS WATER HEATER REQUIRES ABILITY EQUIVALENT TO THAT OF A LICENSED TRADESMAN IN THE FIELD INVOLVED. PLUMBING, AIR SUPPLY, VENTING AND GAS SUPPLY ARE REQUIRED.

GENERAL

The installation must conform to these instructions and the local code authority having jurisdiction. In the absence of local codes, the installation must comply with the current editions of the National Fuel Gas Code ANSI Z223.1/NFPA 54 and the National Electrical Code, NFPA 70. The former is available from the Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131, and both documents are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

GROUNDING

The water heater when installed must be grounded in accordance with local codes, or in the absence of local codes:

In the United States
The National Electric Code, ANSI/NFPA 70.

HIGH ALTITUDE INSTALLATION

WARNING

STANDARD MODELS ARE FOR INSTALLATION UP TO 2,000 FEET (610m) ABOVE SEA LEVEL.

IF A STANDARD MODEL IS INSTALLED ABOVE 2,000 FEET (610m), INPUT RATING SHOULD BE REDUCED AT A RATE 4 PERCENT FOR EACH 1,000 FEET (305m) ABOVE SEA LEVEL WHICH REQUIRES REPLACEMENT OF THE BURNER ORIFICE IN ACCORDANCE WITH THE NATIONAL FUEL GAS CODE (ANSI Z223.1/NFPA 54).

FAILURE TO REPLACE THE STANDARD ORIFICE WITH A HIGH ALTITUDE ORIFICE WHEN INSTALLED ABOVE 2,000 FEET (610m) COULD RESULT IN IMPROPER AND INEFFICIENT OPERATION OF THE WATER HEATER, PRODUCING CARBON MONOXIDE GAS IN EXCESS OF SAFE LIMITS, WHICH COULD RESULT IN SERIOUS INJURY OR DEATH. CONTACT YOUR LOCAL GAS SUPPLIER FOR ANY SPECIFIC CHANGES WHICH MAY BE REQUIRED IN YOUR AREA.

LOCATION OF HEATER

The heater is design certified by the Canadian Standards Association for installation on combustible flooring in a closet having minimum clearances from combustible material of: 0" clearance from sides and rear, 5" from the front and 12" from the top. (Standard clearance.) If clearances stated on the heater differ from standard clearances, install water heater according to clearances stated on heater.

Adequate clearance for servicing this appliance should be considered before installation, such as changing the anodes, etc.

A minimum clearance of 5" must be allowed for access to replaceable parts such as the thermostats, drain valve and relief valve.

When installing the heater, consideration must be given to proper location. Location selected should be as close to the wall as practicable and as centralized with the water piping system as possible.

AIR REQUIREMENTS

Dilution air temperature must be 100°F or less. In calculating the free area of a vent opening, the blocking effect of screens, louvers and grills should be considered. Screens shall not be of a mesh smaller than 1/4 inch square. If the free area is not known, the current edition of National Fuel Gas Code ANSI Z223.1/NFPA 54 recommends using figures of 20-25 percent free area for wood louvers or 60-75 percent for metal grills or louvers.

UNCONFINED SPACE

In buildings of conventional frame, brick or stone construction, unconfined spaces may provide adequate air for combustion, ventilation, and dilution air for power venter.

If the unconfined space is within a building of tight construction (as defined in the most recent revision of the National Fuel Gas Code Handbook), air for combustion, ventilation, and venter dilution must be obtained from outdoors. The installation instructions for confined spaces must be followed.

DANGER

Vapors from flammable liquids may explode and catch fire causing death or severe burns.

Do not use or store flammable products such as gasoline, solvents or adhesives in the same room or area near the water heater.

Keep flammable products:

1. **far away from heater,**
2. **in approved containers,**
3. **tightly closed and**
4. **out of children's reach.**

Water heater has a main burner and hot surface igniter. The hot surface igniter:

1. **can come on at any time and**
2. **will ignite flammable vapors.**

Vapors:

1. **cannot be seen,**
2. **are heavier than air,**
3. **go a long way on the floor and**
4. **can be carried from other rooms to the pilot flame by air currents.**

Installation:
Do not install water heater where flammable products will be stored or used unless the main burner and hot surface igniter are at least 18" above the floor. This will reduce, but not eliminate, the risk of vapors being ignited by the main burner or hot surface igniter.

CONFINED SPACE

When drawing combustion and dilution air from inside a conventionally constructed building to a confined space, such a space shall be provided with two permanent openings; ONE WITHIN 12 INCHES OF THE ENCLOSURE TOP AND ONE WITHIN 12 INCHES OF THE ENCLOSURE BOTTOM. Each opening shall have a free area of one square inch per 1000 Btuh of the total input of all appliances in the enclosure, but not less than 100 square inches.

If the confined space is within a building of tight construction, air for combustion, ventilation and power venter dilution must be obtained from outdoors. When directly communicating with the outdoors or communicating through vertical ducts, two permanent openings, located in the above manner, shall be provided. Each opening shall have a free area of not less than one square inch per 4000 Btuh of the total input of all appliances in the enclosure. If horizontal ducts are used, each opening shall have a free area of not less than one square inch per 2000 Btuh of the total input of all appliances in the enclosure.

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CAUTION

In cold climates provide protection against freeze-up.
THE HEATER SHOULD BE LOCATED IN AN AREA WHERE LEAKAGE OF THE TANK OR CONNECTIONS WILL NOT RESULT IN DAMAGE TO THE AREA ADJACENT TO THE HEATER OR TO LOWER FLOORS OF THE STRUCTURE. When such locations cannot be avoided, a suitable drain pan should be installed under the heater, see fig. 1. The pan should have a minimum length and width of at least 2 inches greater than the diameter of the heater and should be piped to an adequate drain. Drain pans suitable for these heaters are available from your dealer.

Water heater life depends upon water quality, water pressure and the environment in which the water heater is installed. Water heaters are sometimes installed in locations where leakage may result in property damage, even with the use of a drain pan piped to a drain. However, unanticipated damage can be reduced or prevented by a leak detector or water shut-off device used in conjunction with a piped drain pan. These devices are available from some plumbing supply wholesalers and retailers, and detect and react to leakage in various ways:

- Sensors mounted in the drain pan that trigger an alarm or turn off the incoming water to the water heater when leakage is detected.
- Sensors mounted in the drain pan that turn off the water supply to the entire home when water is detected in the drain pan.
- Water supply shut-off devices that activate based on the water pressure differential between the cold water and hot water pipes connected to the water heater.
- Devices that will turn off the gas supply to a gas water heater while at the same time shutting off its water supply.

WARNING

DO NOT INSTALL THIS WATER HEATER DIRECTLY ON A CARPETED FLOOR. A FIRE HAZARD MAY RESULT. Instead the water heater must be placed on a metal or wood panel extending beyond the full width and depth by at least 3 inches (76.2mm) in any direction. If the heater is installed in a carpeted alcove or closet, the entire floor shall be covered by the panel. Also, see DRAINING.

WARNING

For California installation this water heater must be braced, anchored, or strapped to avoid falling or moving during an earthquake. See instructions for correct installation procedures. Instructions may be obtained from your local dealer, wholesaler, public utilities or California's Office of the State Architect, 400 P Street, Sacramento, CA 95814.

WATER CONNECTIONS

Refer to figure 1 for typical installation. A suitable pipe thread sealant must be used to prevent leakage.

WATER (POTABLE) HEATING AND SPACE HEATING

1. All piping components connected to this unit for space heating applications shall be suitable for use with potable water.
2. Toxic chemicals, such as those used for boiler treatment, shall NEVER be introduced into this system.
3. This unit may NEVER be connected to any existing heating system or component(s) previously used with a non-potable water heating appliance.
4. When the system requires water for space heating at temperatures higher than required for domestic water purposes, a tempering valve must be installed. Please refer to Figure 2 for suggested piping arrangement.

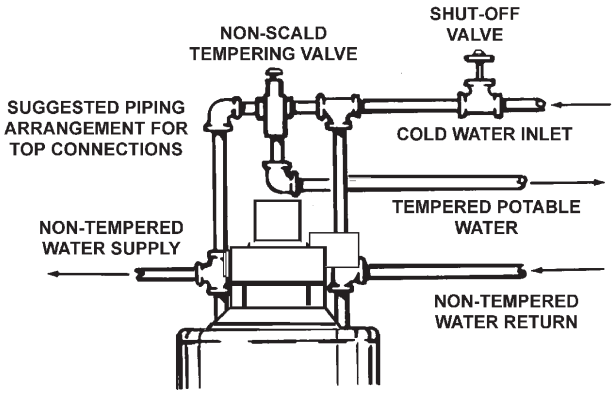

FIGURE 2

CLOSED WATER SYSTEM

A closed system will exist if a back-flow preventer (check valve), or similar device is installed in the cold water line between the water heater and the street main (or well). Excessive pressure may develop due to the thermal expansion of heated water causing premature tank failure or intermittent relief valve operation. This type of failure is not covered by the limited warranty. An expansion tank may be necessary in the cold water supply to alleviate this situation, see fig. 1. Contact the local plumbing authority.

If the temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water supply system. Contact the water supplier or local plumbing inspector on how to correct the situation. Do not plug the temperature and pressure relief valve.

GAS CONNECTIONS

The minimum gas supply pressure is 5.0" W.C for natural gas (11.0" W.C. for propane).

THE HEATER IS NOT INTENDED FOR OPERATION AT HIGHER THAN 14.0" WATER COLUMN SUPPLY PRESSURE. EXPOSURE TO HIGHER GAS SUPPLY PRESSURE MAY CAUSE DAMAGE TO THE CONTROL WHICH COULD RESULT IN FIRE OR EXPLOSION. If overpressure has occurred such as through improper testing of gas lines or emergency malfunction of the supply system, the control must be checked for safe operation. Make sure that the outside vents on the supply regulators and the safety vent valves are protected against blockage. These are parts of the gas supply system not the heater. Vent blockage may occur during ice storms.

IT IS IMPORTANT TO GUARD AGAINST CONTROL FOULING FROM CONTAMINANTS IN THE GAS WAYS. SUCH FOULING MAY CAUSE IMPROPER OPERATION, FIRE OR EXPLOSION.

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1/ NFPA-54) whichever applies. Copper and brass tubing and fittings (except tin lined copper tubing) shall not be used.

REFER TO FIG. 1 FOR CONNECTION DETAILS. BEFORE ATTACHING THE GAS LINE BE SURE THAT ALL GAS PIPE IS CLEAN ON THE INSIDE.

TO TRAP ANY DIRT OR FOREIGN MATERIAL IN THE GAS SUPPLY LINE, A DIRT LEG (SOMETIMES CALLED DRIP LEG) MUST BE INCORPORATED IN THE PIPING, FIG. 1. The dirt leg must be readily accessible. Install in accordance with recommendations of serving gas supplier. Refer to the current edition of National Fuel Gas Code, ANSI Z223.1/NFPA.

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To prevent damage, care must be taken not to apply too much torque when attaching gas supply pipe to gas valve inlet. The thermostat inlet has a pad for use with back up wrench.

Apply joint compounds (pipe dope) sparingly and only to the male threads of pipe joints. Do not apply compound to the first two threads. Use compounds resistant to the action of liquefied petroleum gases. Do not use teflon tape on gas valve fittings.

DISCONNECT THE APPLIANCE AND ITS INDIVIDUAL SHUT OFF VALVE FROM THE GAS SUPPLY PIPING SYSTEM DURING ANY SUPPLY PRESSURE TESTING EXCEEDING 1/2 PSI (3.5 kPa). GAS SUPPLY LINE MUST BE CAPPED WHEN DISCONNECTED FROM THE HEATER. FOR TEST PRESSURES AT 1/2 PSI (3.5 kPa) OR LESS, THE APPLIANCE NEED NOT BE DISCONNECTED, BUT MUST BE ISOLATED FROM THE SUPPLY PRESSURE TEST BY CLOSING THE MAIN MANUAL GAS VALVE.

BEFORE PLACING THE HEATER IN OPERATION, CHECK FOR GAS LEAKAGE. USE SOAP AND WATER SOLUTION OR OTHER MATERIAL ACCEPTABLE FOR THIS PURPOSE. DO NOT USE MATCHES, CANDLES, FLAME OR OTHER SOURCES OF IGNITION TO LOCATE GAS LEAKS.

RELIEF VALVE (P)-FIG. 1

A NEW TEMPERATURE AND PRESSURE RELIEF VALVE COMPLYING WITH THE STANDARD FOR RELIEF VALVES AND AUTOMATIC GAS SHUT OFF DEVICES FOR HOT WATER SUPPLY SYSTEMS, ANSI Z21.22 (CURRENT EDITION) MUST BE INSTALLED IN THE HEATER IN THE MARKED OPENING PROVIDED. THE VALVE MUST BE OF A SIZE (INPUT RATING) THAT WILL BE ADEQUATE FOR YOUR SIZE HEATER.

Check the metal tag on the relief valve and compare it to the heater's rating plate. The pressure rating of relief valve must not exceed the working pressure shown on the rating plate of the heater. In addition the hourly Btu rated temperature steam discharge capacity of the relief valve shall not be less than the input rating of the heater. NO VALVE IS TO BE PLACED BETWEEN THE RELIEF VALVE AND TANK. DO NOT PLUG THE RELIEF VALVE.

The drain line connected to this valve must not contain a reducing coupling or other restriction and must terminate near a suitable drain to prevent water damage during valve operation. The discharge line shall be installed in a manner to allow complete drainage of both the valve and line. DO NOT THREAD, PLUG OR CAP THE END OF THE DRAIN LINE.

VENTING

⚠ WARNING

NEVER OPERATE THE HEATER UNLESS IT IS VENTED TO THE OUTDOORS AND HAS ADEQUATE AIR SUPPLY TO AVOID RISKS OF IMPROPER OPERATION, FIRE, EXPLOSION OR ASPHYXIATION.

Make sure the flue baffle and flue restrictor ring are properly aligned and inserted on top of the flue. This can be checked through the dilution air inlet of the blower.

VENT PIPE TERMINATION

NOTE: Before installing power venter determine place of vent pipe termination. See figure 3 on page 7.

IMPORTANT

The vent system must terminate so that proper clearances are maintained as cited in local codes or the current edition of the National Fuel Gas Code, ANSI Z223.1/NFPA 54, 7.3.4e and 7.8a,b, as follows:

1. The exit terminals of a mechanical vent system shall be not less than 7 feet above grade when located adjacent to public walkways. (Figure. 3)

2. A venting system shall terminate at least 3 feet above any forced air inlet located within 10 feet. (Figure 3)

3. The venting system shall terminate at least 4 feet below, 4 feet horizontally from or, 1 foot above any door, window or gravity air inlet into any building.

   The manufacturer also recommends that the vent termination should not be installed closer than 3 feet from an inside corner of an L shaped structure and not be less than 1 foot above grade.

   The vent shall terminate a minimum of 12" above expected snowfall level to prevent blockage of vent termination.

4. In cold climates, it is recommended that vent termination not be mounted directly above or within 3 feet horizontally from an oil tank vent or gas meter to avoid potential freeze-up from condensation.

Plan the vent system layout so that proper clearances are maintained from plumbing and wiring.

Vent pipes serving power vented appliances are classified by building codes as "vent connectors". Required clearances from combustible materials must be provided in accordance with information in this manual under LOCATION OF HEATER and VENT TERMINAL INSTALLATIONS, and with the National Fuel Gas Code and local codes.

IMPORTANT

Plan the layout of the vent system from the vent termination to the appliance considering all of the 90 degree and 45 degree elbows plus the number of feet of pipe that would be needed to install the total vent system. Make sure to include the 90 degree elbow if required at the blower. Review the tables on page 9 to make sure that the vent system is within the allowed vent configuration. Multiple fittings, 90 or 45 degree, installed in close proximity to each other could result in intermittent lockouts or prevent the unit from firing. Plan the layout to locate the fittings as far apart as possible.

⚠ CAUTION

Termination of the vent system with a device other than the 2", 22.50 degree schedule 40 elbow (supplied with the unit) or a 3", 45 degree schedule 40 elbow (supplied locally) could affect the system performance and result in a safety hazard. If the 3" elbow is used for the vent terminal, then the screens (supplied with this unit) for those elbows must be used and installed according to the provided instructions.

VENT TERMINAL INSTALLATION

1. After the point of termination has been determined, use the cover plate as a template to mark the hole for the vent pipe to insert through the wall. BEWARE OF CONCEALED WIRING AND PIPING INSIDE OF WALL.

2. If the Vent Terminal is being installed on the outside of a finished wall, it may be easier to mark both the inside and outside wall. Align the holes by drilling a hole through the center of the template from the inside through to the outside. The template can now be positioned on the outside wall using the drilled hole as a centering point for the template.

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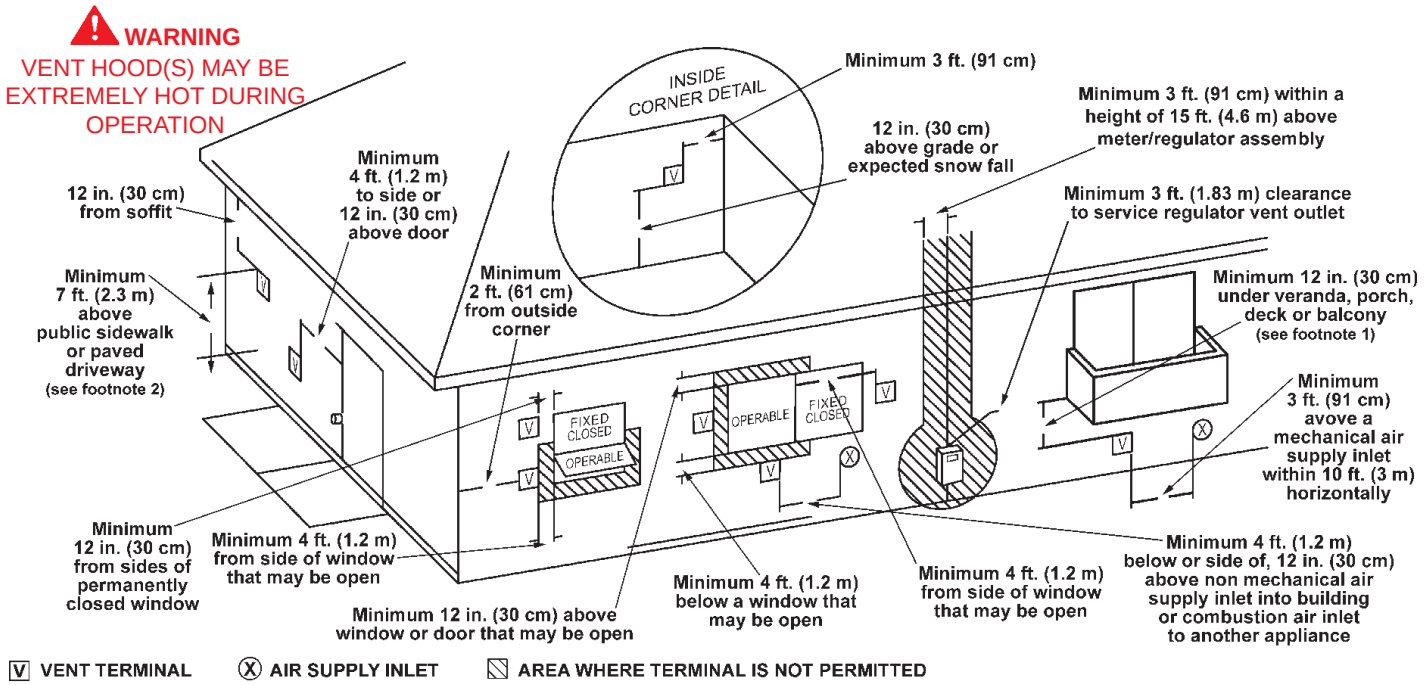
WARNING
VENT HOOD(S) MAY BE EXTREMELY HOT DURING OPERATION
INSIDE CORNER DETAIL
Minimum 3 ft. (91 cm)
Minimum 3 ft. (91 cm) within a height of 15 ft. (4.6 m) above meter/regulator assembly
12 in. (30 cm) above grade or expected snow fall
Minimum 3 ft. (1.83 m) clearance to service regulator vent outlet
Minimum 12 in. (30 cm) under veranda, porch, deck or balcony (see footnote 1)
Minimum 3 ft. (91 cm) avove a mechanical air supply inlet within 10 ft. (3 m) horizontally
12 in. (30 cm) from soffit
Minimum 4 ft. (1.2 m) to side or 12 in. (30 cm) above door
Minimum 2 ft. (61 cm) from outside corner
Minimum 7 ft. (2.3 m) above public sidewalk or paved driveway (see footnote 2)
FIXED CLOSED
OPERABLE
Minimum 12 in. (30 cm) from sides of permanently closed window
Minimum 4 ft. (1.2 m) from side of window that may be open
Minimum 12 in. (30 cm) above window or door that may be open
Minimum 4 ft. (1.2 m) below a window that may be open
Minimum 4 ft. (1.2 m) from side of window that may be open
Minimum 4 ft. (1.2 m) below or side of, 12 in. (30 cm) above non mechanical air supply inlet into building or combustion air inlet to another appliance
V VENT TERMINAL
X AIR SUPPLY INLET
AREA WHERE TERMINAL IS NOT PERMITTED

1. Permitted only if veranda, porch, deck or balcony is fully opened on a minimum of two sides beneath the floor.
2. A vent shall not terminate above a sidewalk or paved driveway that is located between two single family dwellings and serves both dwellings.

FIGURE 3

3. A) MASONRY SIDE WALLS
   Chisel an opening approximately one half inch larger than the marked circle.

   B) WOODEN SIDE WALLS
   Drill a pilot hole approximately one quarter inch outside of the marked circle. This pilot hole is used as a starting point for a saws-all or sabre saw blade. Cut around the marked circle staying approximately one quarter inch outside of the line. (This will allow the vent pipe to easily slide through the opening. The resulting gap will be covered up by the vent terminal cover plates.) Repeat this step on inside wall if necessary.

This unit can vent through 2 or 3 inch nonmetallic pipe and fittings.

The vent pipe installation can be started from either the blower discharge or the termination wall. Keep in mind the total vent system equivalent length (pipe and elbows) when installing the vent system. (SEE VENT TABLES AND FIGURES ON PAGES 9-10.)

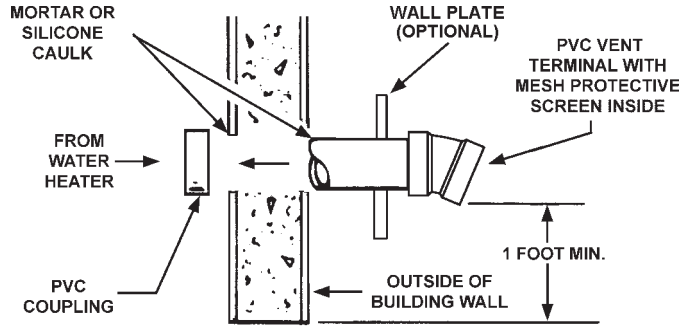

FIGURE 4

The vent terminal should be kept as close as possible to the outside wall, but you need to allow at least 1.5 inches of pipe past the wall, for the wall plate and vent terminal to mount on the pipe.

Before the vent terminal is installed, caulk (not supplied) around the pipe on the exterior wall and install the wall plate (can be held to the outside wall by placing some of the caulking on the back of the plate). The wall plate is supplied for decorative purposes only and is not a requirement for the vent termination (if not needed by the installer).

SEQUENCE OF INSTALLATION

1. The Power Vent Models come with the blower assembly installed.

2. After the unit is set in place, make sure the blower assembly is still mounted securely. Also make sure there is no damage to the blower.

3. Make sure there is no packing material in the discharge of the blower or the intake of the dilution air restrictor. See Fig. 5.

4. Make sure that the plastic tubing is still attached from the air pressure switch to the port on the blower housing.

5. Make sure the ON/OFF switch is in the OFF position and that the outer harness is connected from the blower control box to the connector on the bottom side of the gas valve.

   If the outer harness is not factory installed, make sure the ON/OFF switch is in the OFF position and then connect the outer harness from the blower control box to the connector on the right side of the gas valve.

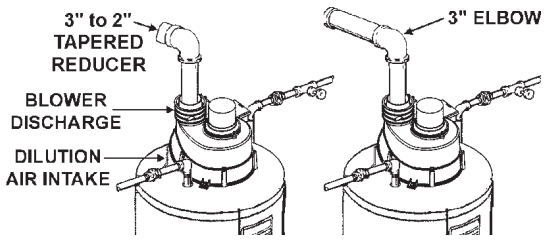

FIGURE 5

Figure 5 shows the optimal placement of the 3" to 2" reducer; however, the vent can be reduced at any point in the vent system as long as the 2" vent tables are followed.

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Do not plug in power cord until vent system is completely installed. The Power Vent operates on 110-120 Vac, therefore a grounded outlet must be within reach of the six (6) foot flexible power cord supplied with the unit (see fig. 1). The power cord supplied may be used only where local codes permit. If local codes do not permit the use of a flexible power supply cord:

a.) Make sure the unit is unplugged from wall outlet. Remove screws and open panel on front of control box.

b.) Cut the flexible power cord, leaving enough to be able to make connections, then remove the strain relief fitting from box.

c.) Install suitable conduit fitting in side of enclosure and then follow (d.) and (e.) below.

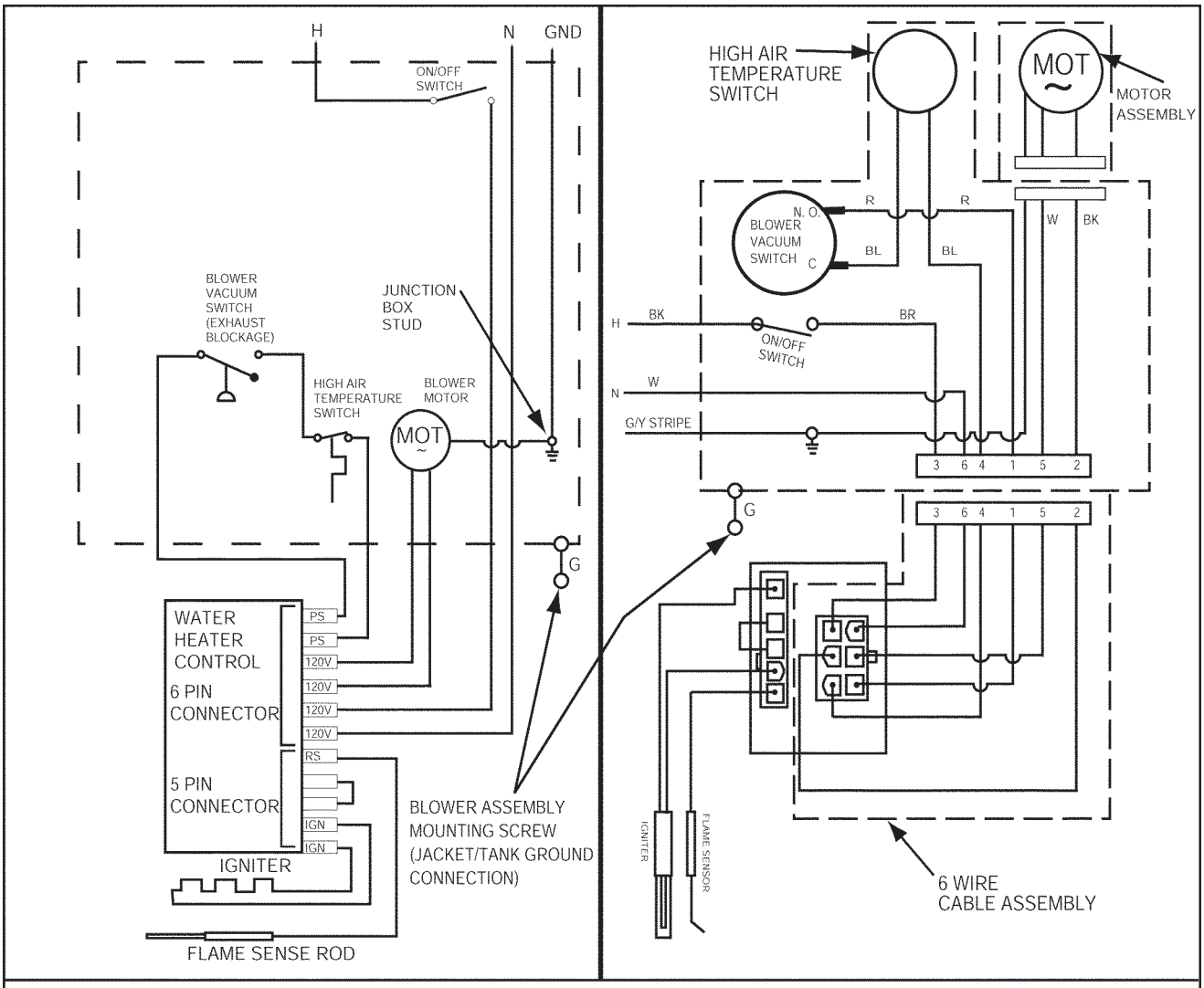
d.) Splice field wiring into existing wiring using code authorized method (wire nuts, etc.).

e.) Be certain that neutral and line connections are not reversed when making these connections.

f.) Close panel on the side of control box, make sure that access panel is secured shut.

CAUTION

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.



You must provide all wiring of the proper size outside of the water heater. You must obey local codes and electric utility requirements when you install this wiring.

This appliance must be electrically grounded in accordance with local codes, or in the absence of local codes, with the National Electrical Code ANSI/NFPA No 70 (current edition) AND OR THE CSA C22.1 ELECTRICAL CODE. (current edition)

Note: If any of the original wire as supplied with the appliance must be replaced, it must be replaced with 105°C wire or its equivalent.

185147-000

FIGURE 6

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TABLE FOR VENT PIPE LENGTH TWO (2) INCH DIAMETER PIPE			
**Number of 90° Elbows	**Number of 45° Elbows	Minimum Pipe	Maximum Pipe
One (1)	None	2 Ft.	30 Ft.
One (1)	One (1)	1 Ft.	27.5 Ft.
Two (2)	None	1 Ft.	25 Ft.
Two (2)	One (1)	1 Ft.	22.5 Ft.
Three (3)	None	1 Ft.	20 Ft.
Three (3)	One (1)	1 Ft.	17.5 Ft.
Four (4)	None	1 Ft.	15 Ft.
Four (4)	One (1)	1 Ft.	12.5 Ft.
THREE (3) INCH DIAMETER PIPE			
** Number of 90° Elbows	**Number of 45° Elbows	Minimum Pipe	Maximum Pipe
One (1)	None	2 Ft.	75 Ft.
One (1)	One (1)	2 Ft.	72.5 Ft.
Two (2)	None	1 Ft.	70 Ft.
Two (2)	One (1)	1 Ft.	67.5 Ft.
Three (3)	None	1 Ft.	65 Ft.
Three (3)	One (1)	1 Ft.	62.5 Ft.
Four (4)	None	1 Ft.	60 Ft.
Four (4)	One (1)	1 Ft.	57.5 Ft.
***Five (5)	None	1 Ft.	55 Ft.
***Five (5)	One (1)	1 Ft.	52.5 Ft.
***Six (6)	None	1 Ft.	50 Ft.

** One (1) 90° elbow is equal to two (2) 45° elbows.

*** It is not recommended that more than (4) 90° elbows be used, or a combination of three (3) 90° and two (2) 45° elbows, but as long as the total length is less than in the chart above, the vent system is acceptable.

Note: For the two (2) and three (3) inch diameter vent pipes, one (1) 90° elbow is approximately the same as five (5) feet of the same diameter straight pipe.

INSTALLATION OF VENT SYSTEM

CAUTION

FOR INSTALLATION OF A NEW VENT SYSTEM, FOLLOW THE GUIDELINES IN THE MANUAL. FOR PRE-EXISTING VENT SYSTEMS, INSPECT THE VENT FOR BLOCKAGE OR ANY SIGNS OF DAMAGE. CHECK TO SEE IF THE VENT PIPE IS PROPERLY PITCHED AND ITS JOINTS SECURED. FOLLOW THE VENTING SPECIFICATIONS IN THIS MANUAL FOR THE RECOMMENDED VENT MATERIAL, TERMINATION AND LOCATION.

(Refer to Figures 3, 4, 5, 7 and 8 as guides).

1. Plan the route of the vent system. Layout the total vent system to use minimum of vent pipe and elbows. The vent piping should be vented downward away from the blower per the required codes. If the vent piping is sloped level or upwards away from the blower, then adequate means for draining and disposing of the condensate needs to be made by the installer.

2. Refer to table above for allowable vent lengths. Nonmetallic vent piping may be used if it has a "Heat Deflection Temperature" (HDT@66psi) of at least 157 degrees F. Some typical nonmetallic vent materials meeting this requirement are schedule 40 PVC to ASTM D2665, schedule 40 CPVC to ASTM D2846, and schedule 40 ABS to ASTM D2661. The cement used should be as recommended by the vent pipe manufacturer. The vent terminal provided is schedule 40 PVC to ASTM D2665 and is a 2", 22.5 degree elbow. If the venting is made with 3" pipe, the vent terminal must be a 3", 45 degree schedule 40 elbow (supplied locally). The supplied screens for the 3" elbow must be used and installed according to the provided instructions when this terminal is used. If a material other than schedule 40 PVC is used for venting, then an equivalent fitting of that material may be substituted if the screen in the PVC terminal is removed and inserted into the new fitting. For water heaters installed in locations with high ambient temperatures (above 100 degrees F), it is recommended that schedule 40 CPVC or ABS be used.

3. See the instructions on pages 10 through 12 for the proper method of cutting and cementing the PVC pipe and fittings.

4. The vent piping should be connected to the blower with a rubber adapter and secured with hose clamps. The adapter and clamps are provided with the heater.

5. Even though the flue gas temperature leaving the blower is between 140°F and 175°F, some installations will have water condense in the vent piping. If this occurs, then adequate means of draining and disposing of the condensate needs to be made by the installer.

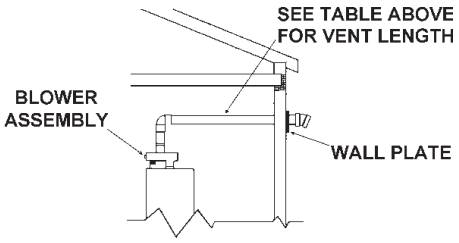

FIGURE 7

The vent pipe may be installed with a slight downward slope to drain condensate away from the blower. The pipe may slope 1/4 inch per five feet of pipe but not more than 1 1/2 inches in the total vent length.

The vent pipe should be properly supported and have supports located no further apart than 5 feet on vertical runs and 3 feet on horizontal runs. All pipe and fittings should be joined by the proper procedures discussed on pages 10 and 11 under the heading: VENT PIPE PREPARATION.

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VERTICAL VENT THROUGH ROOF

This unit is approved for venting through the roof with the type vent terminal that is included with the unit. A proper flashing or "BOOT" should be used to seal the pipe where it exits the roof.

The total vent system should not exceed that which is specified in the table on page 9.

All of the pipe should be secured as per the instructions in the "INSTALLATION OF VENT SYSTEM" on page 9.

VERTICAL VENT TERMINATION RESTRICTIONS

1. Minimum of twelve (12) inches above the roof or twelve (12) inches above the anticipated snow level. Provide proper support for all pipe protruding through the roof.

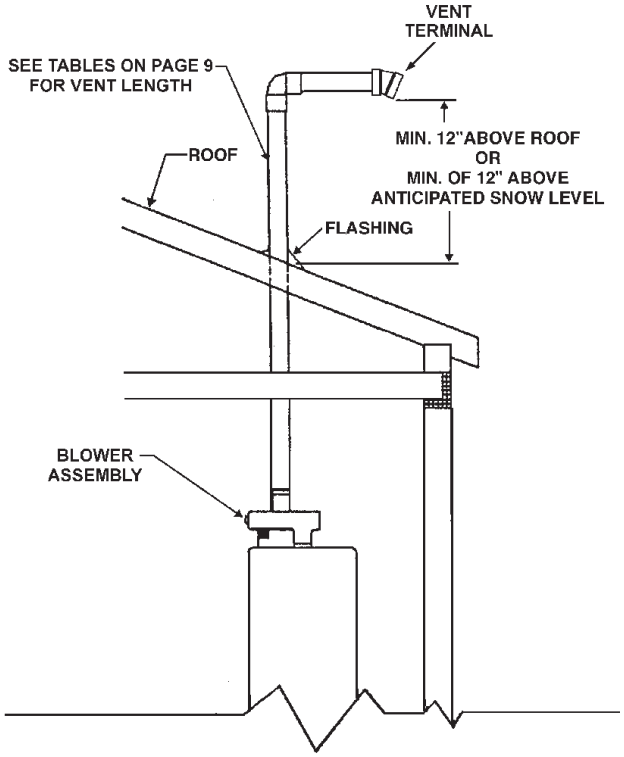
VENT TERMINAL
SEE TABLES ON PAGE 9 FOR VENT LENGTH
ROOF
MIN. 12"ABOVE ROOF OR MIN. OF 12" ABOVE ANTICIPATED SNOW LEVEL
FLASHING
BLOWER ASSEMBLY
*ALL PIPE PROTRUDING THROUGH THE ROOF SHOULD BE PROPERLY SUPPORTED.

FIGURE 8

2. Four (4) feet from or one (1) foot above any gable, dormer, or other roof structure with access to interior of building (i.e.- vent, window etc.).

3. Three (3) feet above any forced air inlet located within ten (10) feet.

VENT PIPE PREPARATION

1. **INITIAL PREPARATION**

   A. Make sure the solvent cement you are planning to use is designed for the specific application you are attempting.

   B. Know the physical and chemical characteristics and limitations of the PVC and CPVC piping materials that you are about to use.

   C. Know the reputation of your manufacturer and their products.

   D. Know your own qualifications or those of your contractor. The solvent welding technique of joining PVC and CPVC pipe is a specialized skill just as any other pipe fitting technique.

   E. Closely supervise the installation and inspect the finished job before start-up.

   F. Contact the manufacturer, supplier, or competent consulting agency if you have any questions about the application or installation of PVC and CPVC pipe.

   G. Take the time and effort to do a professional job. Shortcuts will only cause you problems and delays in start-up. By far, the majority of failures in PVC and CPVC systems are the result of shortcuts and/or improper joining techniques.

2. **SELECTION OF MATERIALS**

- Cutting Device - Saw or Pipe Cutter
- Deburring Tool, Knife, File, or Beveling Machine (2" and above)
- Brush - Pure Bristle
- Rag - Cotton (Not Synthetic)
- Primer and Cleaner
- Solvent Cement - PVC for PVC Components and CPVC for CPVC Components
- Containers - Metal or Glass to hold Primer and Cement. Select the type of PVC or CPVC materials to be used on the basis of their application with respect to chemical resistance, pressure rating, temperature characteristics, etc.
- Insertion Tool - Helpful for larger diameter pipe and fittings (6" and above).

PRIMER

It is recommended that Tetrahydrofuran (THF) be used to prepare the surfaces of pipe and fittings for solvent welding. Do not use water, rags, gasoline or any other substitutes for cleaning PVC or CPVC surfaces. A chemical cleaner such as MEK may be used.

CEMENT

The cement should be a bodied cement of approximately 500 to 1600 centipoise viscosity containing 10-20% (by weight) virgin PVC material solvated with tetrahydrofuran (THF). Small quantities of dimethyl formamide (DMF) may be included to act as a retarding agent to extend curing time. Select the proper cement; Schedule 40 cement should be used for Schedule 40 pipe. Never use all-purpose cements, commercial glues and adhesives or ABS cement to join PVC or CPVC pipe and fittings.

SAFETY PRECAUTION: PRIMERS AND CEMENTS ARE EXTREMELY FLAMMABLE, AND MUST NOT BE STORED OR USED NEAR HEAT OR OPEN FLAME. ALSO, USE ONLY IN A WELL-VENTILATED AREA.

APPLICATORS

Select a suitable pure bristle type paint brush. Use a proper width brush or roller to apply the primer and cement (see chart below). Speedy application of cement is important due to its fast drying characteristics. IMPORTANT NOTE: A dauber type applicator should only be used on pipe sizes 2" and below. For larger diameter pipe, a brush or roller must be used.

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RECOMMENDED BRUSH* SIZE FOR PRIMER AND CEMENT APPLICATIONS	
Nominal Pipe (IPS)	Size Brush Width (INS.)
2	1-1/2
3	1-1/2 - 2-1/2

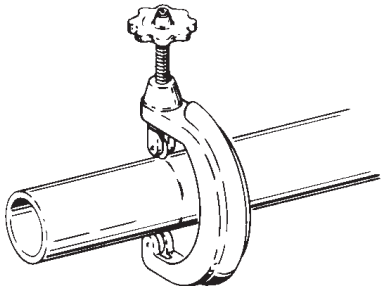
***USE ONLY NATURAL BRISTLE**

3. **MAKING THE JOINT**

A. Cutting

Pipe must be squarely cut to allow for the proper interfacing of the pipe end and the fitting socket bottom. This can be accomplished with a miter box saw or wheel type cutter. Wheel type cutters are not generally recommended for larger diameters since they tend to flare the corner of the pipe end. If this type of cutter is used, the flare on the end must be completely removed.

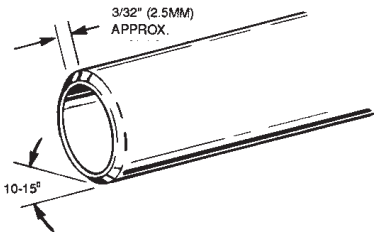
NOTE: Power saws should be specifically designed to cut plastic pipe.



STEP A

B. Deburring

Use a knife, plastic pipe deburring tool, or file to remove burrs from the end of small diameter pipe. Be sure to remove all burrs from around the inside as well as the outside of the pipe. A slight chamfer (bevel) of about 10°-15° should be added to the end to permit easier insertion of the pipe into the end of the fitting. Failure to chamfer the edge of the pipe may remove cement from the fitting socket, causing the joint to leak.



STEP B

C. Test dry fit of the joint

Tapered fitting sockets are designed so that an interfaced fit should occur when the pipe is inserted about 1/3 to 2/3 of the way into the socket. Occasionally, when pipe fitting dimensions are at the tolerance extremes, it will be possible to fully insert dry pipe to the bottom of the fitting socket. When this happens, a sufficient quantity of cement must be applied to the joint to fill the gap between the pipe and fitting. The gap must be filled to obtain a strong, leak-free joint.

D. Inspection, cleaning, priming

Visually inspect the inside of the pipe and fitting sockets and remove all dirt, grease or moisture with a clean dry rag. If wiping fails to clean the surfaces, a chemical cleaner must be used. Check for possible damage such as splits or cracks and replace if necessary.

Depth-of-entry

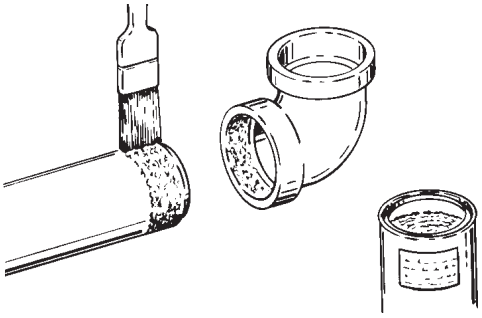
Marking the depth of entry is a way to check if the pipe has reached the bottom of the fitting socket in Step F. Measure the fitting depth and mark this distance on the pipe O.D. You may want to add several inches to the distance and make a second mark as the primer and cement will most likely destroy your first one.

Apply primer to the surface of the pipe and fitting socket with a natural bristle brush (see chart on page 11). This process softens and prepares the PVC or CPVC for the solvent cementing step. Move quickly and without hesitation to the cementing procedure while the surfaces are still wet with primer.

E. Application of solvent cement

- Apply the solvent cement evenly and quickly around the outside of the pipe at a width a little greater than the depth of the fitting socket.
- Apply a light coat of cement evenly around the inside of the fitting socket. Avoid puddling.
- Apply a second coat of cement to the pipe end.

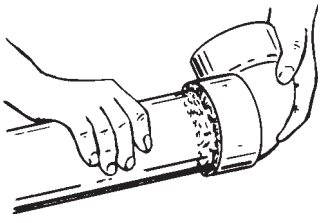
NOTE: Cans of cement and primer should be closed at all times when not in use to prevent evaporation of chemicals and hardening of cement. They are also very flammable and should be kept away from heat or flame.



STEP E

F. Joint assembly

Working quickly, insert the pipe into the fitting socket bottom and give the pipe or fitting a 1/4" turn to evenly distribute the cement. Do not continue to rotate the pipe after it has hit the bottom of the fitting socket. A good joint will have sufficient cement to make a bead all the way around the outside of the fitting hub. The fitting will have a tendency to slide back while the cement is still wet so hold the joint together for about 15 seconds.



STEP F

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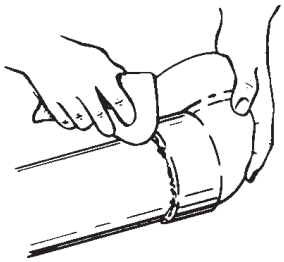
G. Cleanup and joint movement

Remove all excess cement from around the pipe and fitting with a dry cotton rag. This must be done while the cement is still soft.

The joint should not be disturbed immediately after the cementing procedure, and sufficient time should be allowed for proper curing of the joint. Exact drying time is difficult to predict because it depends on variables such as temperature, humidity and cement integrity. For more specific information, you should contact your solvent cement manufacturer.



STEP G

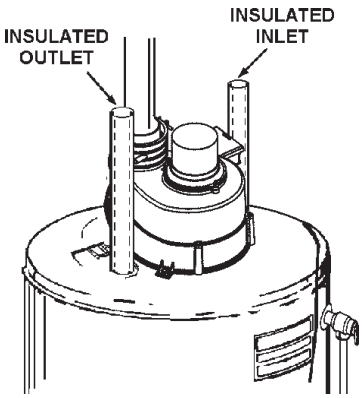
T & P VALVE and PIPE INSULATION

Remove insulation for T & P Valve and pipe connections from carton.

Fit pipe insulation over the incoming cold water line and the hot water line. Make sure that the insulation is against the top cover of the heater.

Fit T & P valve insulation over valve. Make sure that the insulation does not interfere with the lever of the T & P valve.

Secure all insulation using tape.



OPERATION

WARNING

NEVER OPERATE THE HEATER WITHOUT FIRST BEING CERTAIN IT IS FILLED WITH WATER AND A TEMPERATURE AND PRESSURE RELIEF VALVE IS INSTALLED IN THE RELIEF VALVE OPENING OF THE HEATER. DO NOT ATTEMPT TO OPERATE HEATER WITH COLD WATER INLET VALVE CLOSED.

TO OPERATE THE WATER HEATER

FILLING

1. Close the heater drain valve by turning handle clockwise Fig. 1 (T)
2. Open a nearby hot water faucet to permit the air in the system to escape.
3. Fully open the cold water inlet pipe valve (allowing the heater and piping to be filled. Fig. 1(M)
4. Close the hot water faucet as water starts to flow from the faucet.
5. The heater is ready to be operated.

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FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.

FLAMMABLE

BEFORE OPERATING: ENTIRE SYSTEM MUST BE FILLED WITH WATER AND AIR PURGED FROM ALL LINES.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. **Do NOT try to light the burner by hand.**

B. **BEFORE OPERATING** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

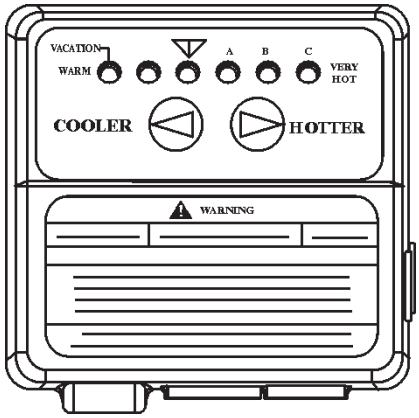
WHAT TO DO IF YOU SMELL GAS:

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in the gas control buttons. Never use tools. If the control buttons will not push in, don't try to repair them, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately contact a qualified installer or service agency to replace a flooded water heater. Do not attempt to repair the unit! It must be replaced!

OPERATING INSTRUCTIONS



1. STOP! Read the safety information above, on this label.
2. Set the thermostat to the lowest setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the COOLER button until the WARM indicator light appears.
3. Turn the "ON/OFF" switch on the blower control box to the "OFF" position.
4. This appliance is equipped with a device which automatically lights the burner. **DO NOT TRY TO LIGHT THE BURNER BY HAND.**
5. Wait five (5) minutes to clear out any gas. If you then smell gas, STOP! Follow "B" in the safety information above on this label. If you don't smell gas, go to the next step.
6. Turn on all electrical power to the appliance.
7. Set thermostat to desired setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the HOTTER button.
8. If the appliance will not operate, follow the instructions "TO TURN OFF GAS TO APPLIANCE" and call your technician or gas supplier.
9. WATER TEMPERATURE ADJUSTMENT ▼ is approximately 120°F.

CAUTION: Hotter water increases the risk of scald injury. Consult the instruction manual before changing temperature.

WARNING: TURN OFF ALL ELECTRIC POWER BEFORE SERVICING

TO TURN OFF GAS TO APPLIANCE

1. Set thermostat to the lowest setting by first pressing the COOLER and HOTTER buttons together and holding for 1 second. Then press the COOLER button until the WARM indicator light appears.
2. Set the ON/OFF switch on the blower control box to the "OFF" position.
3. Turn off all electric power to the appliance if service is to be performed.

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TEMPERATURE REGULATION

WARNING

THIS WATER HEATER IS EQUIPPED WITH AN ADJUSTABLE THERMOSTAT TO CONTROL WATER TEMPERATURE. HOT WATER TEMPERATURES REQUIRED FOR AUTOMATIC DISHWASHER AND LAUNDRY USE CAN CAUSE PAINFUL SCALDING WITH POSSIBLE SERIOUS AND PERMANENT INJURY. THE TEMPERATURE AT WHICH INJURY OCCURS VARIES WITH THE PERSON'S AGE AND THE TIME OF EXPOSURE. THE SLOWER RESPONSE TIME OF CHILDREN, AGED OR DISABLED PERSONS INCREASES THE HAZARDS TO THEM. NEVER ALLOW SMALL CHILDREN TO USE A HOT WATER TAP OR TO DRAW THEIR OWN BATH WATER. NEVER LEAVE A CHILD OR DISABLED PERSON UNATTENDED IN A BATHTUB OR SHOWER.

THE WATER HEATER SHOULD BE LOCATED IN AN AREA WHERE THE GENERAL PUBLIC DOES NOT HAVE ACCESS.

It is recommended that lower water temperatures be used to avoid the risk of scalding. It is further recommended, in all cases, that the water temperature be set for the lowest temperature which satisfies your hot water needs. This will also provide the most energy efficient operation of the water heater. The water temperature setting was factory set at the lowest temperature; Pressing the “COOLER” ◀ button decreases temperature and pressing the “HOTTER” ▶ button increases the temperature.

SETTING THE WATER HEATER TEMPERATURE AT 120°F (APPROX. "▼" MARK ON TEMPERATURE SETTING OF GAS VALVE) WILL REDUCE THE RISK OF SCALDS. Some states require settings at specific lower temperatures.

Figure 9 shows the approximate water temperatures produced at various thermostat settings. Short repeated heating cycles caused by small hot water uses can cause temperatures at the point of use to exceed the thermostat setting by up to 30°F (17ºC). If you experience this type of use you should consider using lower temperature settings to reduce scald hazards.

Valves for reducing the point-of-use temperature by mixing cold and hot water are available. See figure 2. Also available are inexpensive devices that attach to faucets to limit hot water temperatures. Contact a licensed plumber or the local plumbing authority.

To avoid any unintentional changes in water temperature settings, the control has a tamper resistant feature for changing the temperature setting. To change the temperature setting follow these instructions:

1. “Wake Up” the temperature indicators by holding down both “COOLER” and “HOTTER” temperature adjustment buttons at the same time for one second (See Figure 9). One or two of the temperature indicators will light up. These indicators will only remain on for 30 seconds if no further buttons are pressed. After 30 seconds the control will go back to “Sleep” mode.

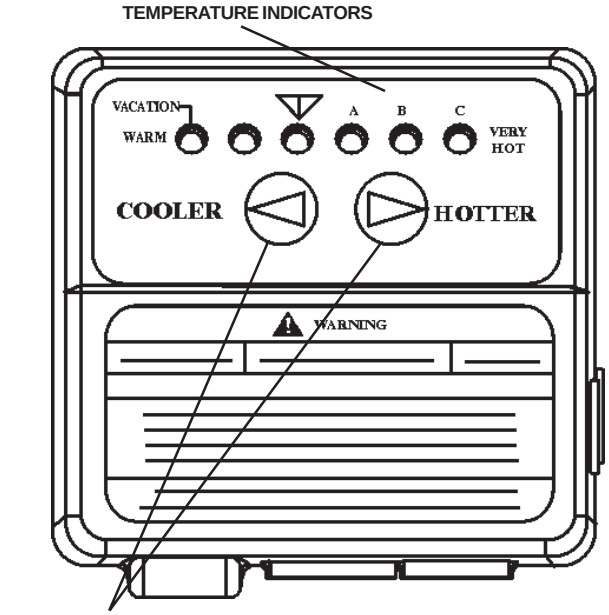
2. Release both of the temperature adjustment buttons.

   A. To decrease the temperature press and release the “COOLER” button until the desired setting is reached.

   B. To increase the temperature press and release the “HOTTER” button until the desired setting is reached.

NOTE: Holding down the button will not continue to lower or raise the temperature setting. The button must be pressed and released for each temperature change desired.

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUTOFF, TURN OFF THE MANUAL GAS CONTROL VALVE TO THE APPLIANCE. SEE FIGURE 1(G).



Temperature Setting	Display ▼ A B C	Time to Produce 2nd & 3rd Degree Burns on Adult Skin
C - Flashing = approx. 160°F	○○○○○●	About 1/2 seconds
C = approx. 150°F	○○○○○●	About 1-1/2 seconds
B = approx. 140°F	○○○○●○	Less than 5 seconds
A = approx. 130°F	○○○●○○	About 30 seconds
▼ = approx. 120°F	○○●○○○	More than 5 minutes
WARM = approx. 80°F	●○○○○○	- - - - - - - - - - - - - - -

FIGURE 9

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WATER HEATING IGNITION SEQUENCE

(Make sure gas and electric power are connected properly)

1) The ignition control module is powered and monitors the system, waiting for a call for heat from the thermostat.

2) The thermostat calls for heat by reading a resistance value within a given range directly proportional to water temperature.

3) The control Module:
   a) Checks the pressure switch for an open circuit.
   b) Energizes the blower.
   c) Checks the pressure switch for a closed circuit to prove draft.
   d) Sends line voltage to the hot surface igniter with a 20 second warm up period.
   e) Opens the gas valve and checks the sensing rod for flame.

4) The burner heats the water to the desired thermostat setting.
   a) The resistance in the thermostat rises to the value selected by the temperature setting.
   b) The control module closes the gas valve and 5 seconds later, removes power from the blower.

5) Cycle is completed.

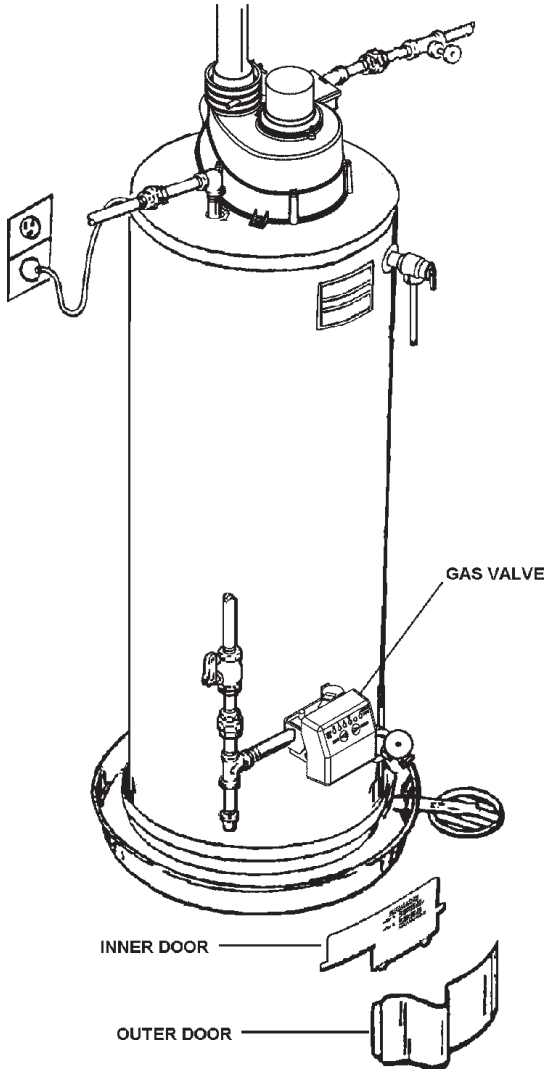

FIGURE 10

CONTROL SEQUENCE - HOT SURFACE DIRECT IGNITION	
Pre-purge	5 seconds.
HSI Warm-up	20 seconds.
Ignition Activation Period	4 seconds.
Flame Recognition Period	1 second.
Ignition Trial	4 seconds.
Interpurge	5 seconds.
Post-purge	5 seconds.
Retries	2
Reset from Lockout	1 hr.
Flame Sensing (Nominal) HSI Off/Run Mode	4.0µV DC

MAINTENANCE

WARNING

DISCONNECT FROM ELECTRICAL SUPPLY BEFORE SERVICING UNIT.

FOR YOUR SAFETY, WATER HEATER SERVICE SHOULD BE PERFORMED ONLY BY A QUALIFIED SERVICE TECHNICIAN. READ THE GENERAL SAFETY INFORMATION SECTION FIRST.

USERS OF THIS APPLIANCE SHOULD BE AWARE THAT GAS COMPONENTS WEAR OUT OVER A PERIOD OF TIME. THE GAS CARRYING COMPONENTS OF THIS APPLIANCE SHOULD BE INSPECTED FOR PROPER OPERATION PERIODICALLY BY A QUALIFIED SERVICE TECHNICIAN.

MAIN BURNER -FIG. 1

Check main burner every 12 months for proper flame characteristics. This is done by removing door(s) on heater, fig. 1. The main burner should provide complete combustion of gas; ignite rapidly; give reasonably quiet operation; cause no excessive flame lifting from burner ports. Make sure that the flow of combustion and ventilation air is not blocked.

If proper flame characteristics are not evident, check for accumulation of lint or other foreign material that restricts or blocks the air openings in the heater or burner. Also check AIR REQUIREMENTS.

WARNING

SOOT BUILD-UP INDICATES A PROBLEM THAT REQUIRES CORRECTION BEFORE FURTHER USE. Consult with a qualified service technician.

Should the main burner or burner air openings require cleaning, turn the blower switch to “OFF” position and allow the burner to cool. Remove the burner and clean with a soft brush. Clean main burner orifice with a suitable soft material.

HIGH TEMPERATURE LIMIT SWITCH (Single-Use Type Energy Cut Off)

The thermostat has a built-in limit switch which will actuate in case of excessive water temperatures. The heater cannot be operated until the Gas Control Valve is replaced It is important that a serviceman be called to determine the reason for limit operation and thus avoid repeated thermostat replacement. Lower the temperature adjustment setting on new control.

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VENTING SYSTEM

HAVE VENTING SYSTEM CHECKED EVERY SIX MONTHS FOR OBSTRUCTIONS AND/OR DETERIORATION IN VENT PIPING.

BLOWER ASSEMBLY MAINTENANCE

CAUTION

The air flow restrictor screen on the inlet side of the blower unit should be checked periodically for any accumulation of dust and lint. Any build up of dirt in the screen can result in insufficient dilution air and excessive vent temperatures that could cause heat damage to the PVC pipe or cause the thermal switch to safely shut the unit down. Should this happen, the build up of the lint/dirt needs to be cleaned.

The venter must be inspected four times a year. Points of inspection are:

1. MOTOR - Motor must rotate freely.
2. WHEEL - Wheel must be clean of soot, ash, lint or any other coating which inhibits either rotation or air flow. Remove all foreign material from vent system before operating.
3. The pressure switch part inside the power venter must be open and free from deposits of soot, carbon, etc.

For safety and satisfactory operation it is recommended that the heater be checked once a year by a competent service person.

T & P VALVE

At least once a year, the temperature and pressure relief valve must be checked to ensure that it is in operating condition. Lift the lever at the top of the valve several times until the valve seats properly and operates freely.

DANGER

THE WATER PASSING OUT OF THE VALVE DURING THIS CHECKING OPERATION MAY BE EXTREMELY HOT. AVOID CONTACT AND DISCHARGE SAFELY TO PREVENT WATER DAMAGE.

If temperature and pressure relief valve on the appliance discharges periodically, this may be due to thermal expansion in a closed water system. Contact the water supplier or local plumbing inspector on how to correct this situation. DO NOT PLUG the temperature and pressure relief valve.

DRAINING (T)-FIG. 1

If the heater is to be shut off and exposed to freezing temperatures, it must be drained. Water, if left in the tank and allowed to freeze, will damage the heater.

- Turn off the gas and cold water inlet valve to the heater.
- Open a nearby hot water faucet and the heater drain valve.
- BE CAREFUL TO GRASP THE DRAIN VALVE HANDLE SO THAT THE HAND IS NOT EXPOSED TO HOT WATER. IF DESIRED, A HOSE MAY BE CONNECTED TO THE DRAIN VALVE TO CARRY THE WATER AWAY.

DANGER: THE WATER MAY BE HOT.

- The drain valve must be left open during the shutdown period.
- To restart heater, refer to the FILLING instructions under OPERATION.

Periodically open the drain valve and allow the water to run until it flows clean. This will help prevent sediment build-up in the tank.

It is normal for lime and scale deposits to form within the tank. Such deposits will not be removed by periodic draining. It is necessary to chemically delime the affected parts in water areas where such deposits are encountered.

CONDENSATION

Water vapor can condense on the cooler surfaces of the tank forming droplets, which drip into the fire or run out on the floor. This is common at the time of startup after installation, during periods of time when incoming water is very cold, or the heater may be undersized for the requirements.

Droplets from the bottom of the flue may be due to corrosive combustion products or improper venting. Check with your dealer for more information.

CATHODIC PROTECTION - ANODE (FIG. 1)

The anode rod is used to protect the tank from corrosion. Most hot water tanks are equipped with an anode rod. The submerged rod sacrifices itself to protect the tank. Instead of corroding the tank, water ions attack and eat away the anode rod. This does not affect the water's taste or color. The rod must be maintained to keep the tank in operating condition.

Anode deterioration depends on water conductivity, not necessarily water condition. A corroded or pitted anode rod indicates high water conductivity and should be checked and/or replaced more often than an anode rod that appears to be intact. Replacement of a depleted anode rod can extend the life of your water heater. Inspection should be conducted by a qualified technician, and at a minimum should be checked annually after the warranty period.

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WARNING: DO NOT BY-PASS ANY CONTROLS TO MAKE HEATER OPERATE. OPERATE ONLY AS WIRED FROM FACTORY.

TROUBLE SHOOTING

Please check guidelines below. For your safety, water heater service should be performed only by a qualified service technician. Read the GENERAL SAFETY INFORMATION section first.

WATER HEATER CONTROL

LED STATUS	PROBLEM	SOLUTION
	An open earth ground circuit to the ignition system.	1. Check that the earth ground connection is properly connected. 2. Check that the ground conductor on the water heater is properly connected.
	Wiring error or a high resistance to earth ground.	1. Check for proper connection of line neutral and hot wires. 2. Check that the water heater is securely connected to earth ground.
	Pressure switch remained closed longer than 5 seconds after the call for heat began.	1. Pressure switch wiring is incorrect. 2. Replace pressure switch.
	Pressure switch remained open longer than 5 seconds after the combustion blower was energized.	1. Pressure switch wiring is incorrect. 2. Pressure switch tubing not connected correctly. 3. Air intake or exhaust obstructed.
	Error in the hot surface ignitor circuit.	1. Check that all wiring is correct and secure. 2. Replace hot surface ignitor.
	System in lockout.	1. Gas supply is off or too low to operate. 2. Hot surface ignitor not positioned correctly. 3. Low voltage to the water heater. 4. Electric polarity to unit is incorrect - test and correct.
	Problem in the gas valve driver circuit.	1. Turn power to the water heater off for 10 seconds and the back on. 2. Replace gas control valve.
	Problem with the internal circuit.	1. Turn power to the water heater off for 10 seconds and then back on. 2. Replace gas control valve.
	Problem with the internal circuit.	1. Turn power to the water heater off for 10 seconds and then back on. 2. Replace gas control valve.
	Flame signal sensed out of proper sequence.	1. Replace gas control valve.
	ECO activated.	1. Replace gas control valve.
	One of the temperature adjust buttons stuck closed.	1. Press and release each of the buttons once. 2. Replace gas control valve.
	Water temperature sensor is either open or short circuited.	1. Check that all wiring is correct and secure. 2. Replace gas control valve.

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TROUBLE SHOOTING (Continued)

PROBLEM	CAUSE	SOLUTION
NOT ENOUGH HOT WATER	1) Blower will not run.	
	A) "ON/OFF" control switch turned off.	Turn switch to the "ON" position.
	B) Blower unplugged.	Plug blower back into 115 Vac. outlet.
	C) No power at outlet.	Repair service to outlet.
	D) Thermostat defective.	Replace thermostat.
	E) Control harness defective.	Replace control harness.
	F) High limit control circuit open.	Replace thermostat.
	G) Blower motor defective.	Replace Blower Assembly.
	Thermostat problems.	
	A) Thermostat set too low.	Turn temperature control higher.
	B) Thermostat or ECO defective.	Replace thermostat.
	Others	
	A) Heater undersized.	Reduce hot water use.
	B) Low gas pressure.	Contact dealer.
	C) Incoming water is unusually cold.	Allow more time for heater to reheat.
	D) Leaking hot water pipes or fixtures.	Have plumber check and repair leaks.
VENT PIPE TOO HOT (ABOVE 170°F)	A) Defective air flow restrictor.	Take unit out of service immediately, call the manufacturer's representative.
	B) Not enough dilution air to mix with flue gases.	Proper dilution air must be provided for combustion and dilution of flue temp. Refer to "INSTALLATION" section.
	C) Dilution air too hot for mixing with flue gases.	Supply air is too hot. Check for heat sources around and/or blockage of dilution air intake.
	D) Wrong burner orifice.	Install correct orifice.
YELLOW FLAME	A) Dirt in burner ports	Turn off heater and gas, clean burner head.
	B) Combustion air path restricted.	Check dilution air intake, exhaust venting, and air openings in bottom base pan for obstructions or blockage.
	C) Not enough dilution air for proper combustion.	Check dilution air intake for obstructions or blockage.
CONDENSATION	A) Water on the floor under heater.	See "CONDENSATION" section.
	B) Water dripping from blower assembly.	Install condensate drain hose (supplied locally) on drain port of rubber boot of blower assembly or provide a drip "TEE" in the vent pipe to catch the condensation. See figure 1 and the Installation of Vent System instructions.
WATER LEAKS	Improperly sealed, hot or cold supply connections, relief valve, drain valve or thermostat threads.	Tighten threaded connections.
	Leakage from other appliances or water water lines.	Inspect other appliances near water heater.
	Condensation of flue products.	Refer to "CONDENSATION" section.
LEAKING T&P	Thermal expansion in closed water system.	Install thermal expansion tank (DO NOT plug T&P valve).
	Improperly seated valve.	Check relief valve for proper operation (DO NOT plug T&P valve).
HOT WATER ODORS (Refer to CATHODIC PROTECTION	High sulfate or mineral content in water supply.	Drain and flush heater thoroughly then refill.
	Bacteria in water supply.	Chlorinate water supply.
WATER TOO HOT	Thermostat set too high.	Refer to HIGH TEMPERATURE REGULATION.
WATER HEATER SOUNDS SIZZLING-RUMBLING	Condensation dripping on burner.	Refer to CONDENSATION above.
	Sediment at bottom of heater tank.	Clean sediment from tank. Refer to DRAINING instruction in Maintenance section of manual.
SOOTING	Improper combustion.	Refer to AIR REQUIREMENTS on page 4.
HEATER LIGHTS BUT GOES OUT IN 4-5 SECONDS	Outlet polarity is reversed.	Test polarity and correct.

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LIMITED RESIDENTIAL GAS WARRANTY

THIS WARRANTY IS APPLICABLE TO THE ORIGINAL OWNER ONLY. If the glass lined tank in this water heater shall prove upon examination by A. O. Smith Corporation (the warrantor) to have leaked during the warranty period in normal residential use, due to natural corrosion from potable water therein, the warrantor will furnish the ORIGINAL OWNER a replacement A. O. Smith water heater of equivalent size and current model, or a replacement part for any component part which fails in normal use, in accordance with the warranty terms and conditions specified below. THE A. O. SMITH REPLACEMENT MODEL OR PART WILL BE WARRANTED FOR ONLY THE UNEXPIRED PORTION OF THE ORIGINAL WARRANTY. The warranty period will be determined by the original installation date of the water heater. PROOF-OF-PURCHASE AND PROOF-OF-INSTALLATION ARE NECESSARY TO VALIDATE THIS WARRANTY. This warranty is not transferable and applies to models listed in Table 1.

TABLE 1

MODEL	WARRANTY PERIOD TANK[1]	PARTS[2]
GPSH	6 YEARS	6 YEARS
GPCR	6 YEARS	6 YEARS

When the water heater has been used for other than single family residential application: 1. The tank warranty shall be reduced to 1 year. 2. The parts warranty shall be reduced to 1 year for all models. Returned parts which meet any of the following conditions are not covered by this warranty: 1) improper installation or removal; 2) damaged by other than normal wear; 3) replaced for cosmetic purposes; or 4) returned with defaced date codes.

CONDITIONS AND EXCEPTIONS

This warranty shall apply only when the water heater is installed and operated in accordance with: 1) all local fire codes and plumbing codes, ordinances and regulations; 2) the printed instructions provided with it; 3) good industry practices; and 4) proper safety practices such as but not limited to a properly sized drain pan if installed in an area where leakage from connections of the tank would result in damage to the area adjacent to the heater. In addition, a new temperature and pressure relief valve, certified by the American Gas Association must have been properly installed and piped to the nearest drain.

This warranty shall apply only when the heater is:

- owned by the original purchaser;
- used at temperatures not exceeding the maximum calibrated setting of its thermostat;
- not subjected to excessive water pressure fluctuations and not subject to an operating pressure greater than 150 P.S.I.;
- filled with potable water, free to circulate at all times and with the tank free of damaging water sediment or scale deposits;
- used in a non-corrosive and non-contaminated atmosphere;
- used with factory approved anode(s) installed;
- in its original installation location;
- in the United States, its territories or possessions.
- sized in accordance with proper sizing techniques for residential water heaters;
- bearing a rating plate which has not been altered, defaced or removed except as required by the warrantor;
- used in an open system or in a closed system with a properly sized and installed thermal expansion tank;
- fired at the factory rated input using the fuel stated in the face of the rating plate;
- operated with the inner and outer combustion chamber doors in place;
- maintained in accordance with the instructions printed in the manual included with the heater.

Any accident to the water heater or any part thereof (including freezing, fire, floods, or lightning), any misuse, abuse or alteration of it, any operation of it in a modified form, or any attempt to repair tank leaks or parts, will void this warranty.

SERVICE AND LABOR RESPONSIBILITY

UNDER THIS LIMITED WARRANTY, THE WARRANTOR WILL PROVIDE ONLY A REPLACEMENT WATER HEATER OR PART THEREOF. THE OWNER IS RESPONSIBLE FOR ALL OTHER COSTS. Such costs may include but are not limited to:

a. Labor charges for service, removal, or reinstallation of the water heater or part thereof.
b. Shipping and delivery charges for forwarding the new water heater or replacement part from the nearest distributor and returning the claimed defective heater or part to such distributor except in the state of California where such charges are the manufacturer's responsibility.
c. All cost necessary or incidental for handling and administrative charges, and for any materials and/or permits required for installation of the replacement heater or part.

LIMITATION ON IMPLIED WARRANTIES

Implied warranties, including any warranty of merchantability imposed on the sale of this heater under state law are limited to one year duration for the heater or any of its parts. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

CLAIM PROCEDURE

Any claim under this warranty should be initiated with the dealer who sold the heater, or with any other dealer handling the warrantor's products. If this is not practical, the owner should contact: A. O. Smith Water Products Company, 5621 West 115th Street, Alsip, Illinois, 60803 (800) 323-2636.

The warrantor will only honor replacement with identical or similar water heater or parts thereof which are manufactured or distributed by the warrantor.

Dealer replacements are made subject to in-warranty validation by warrantor.

PROOF-OF-PURCHASE AND PROOF-OF-INSTALLATION DATES ARE REQUIRED TO SUPPORT WARRANTY FOR CLAIM FROM ORIGINAL OWNER. THIS FORM DOES NOT CONSTITUTE PROOF-OF-PURCHASE OR PROOF-OF-INSTALLATION.

DISCLAIMERS

NO EXPRESS WARRANTY HAS BEEN OR WILL BE MADE IN BEHALF OF THE WARRANTOR WITH RESPECT TO THE MERCHANTABILITY OF THE HEATER OR THE INSTALLATION, OPERATION, REPAIR OR REPLACEMENT OF THE HEATER OR PARTS. THE WARRANTOR SHALL NOT BE RESPONSIBLE FOR WATER DAMAGE, LOSS OF USE OF THE UNIT, INCONVENIENCE, LOSS OR DAMAGE TO PERSONAL PROPERTY, OR OTHER CONSEQUENTIAL DAMAGE. THE WARRANTOR SHALL NOT BE LIABLE BY VIRTUE OF THIS WARRANTY OR OTHERWISE FOR DAMAGE TO ANY PERSONS OR PROPERTY, WHETHER DIRECT OR INDIRECT, AND WHETHER ARISING IN CONTRACT OR IN TORT.

Some states do not allow the limitation or exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Fill out and keep with water heater.

IMPORTANT INFORMATION

Model Number _____

Serial Number _____

Installation Information:

Date Installed _____

Company's Name _____

Street or P.O. Box _____

City, State, and Zip Code _____

Phone Number _____ Plumber's Name _____

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REPLACEMENT PARTS

A.O. SMITH
WATER PRODUCTS COMPANY

5621 W. 115TH STREET, ALSIP, IL 60803
PHONE: 1-800-433-2545 FAX: 1-800-433-2515
www.hotwater.com E-mail: parts@hotwater.com

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